

# MECHELECIV

The Library of  
The George Washington University  
Washington, D.C.

ENGINEERS' WEEK

CAD/CAM AT GWU

D — H HOUSE

THE CO-OP PROGRAM

FUTURE OF FIBER OPTICS

DARK SIDE OF EDUCATION

November 1982

See Us On Campus

It is indeed a pleasure to be able to talk about the Engineers' Lounge not as a thing of the future, but rather as a reality located in JH 301. After all, these years of waiting, it is truly seems possible to walk into JH 301 and find a very lounge-looking room which we can move of ours call our own. And this room is all ready for you engineers to relax in; so drop in and see what you think about it. Let's make it the meeting place of the Engineering School!

But first, a word of caution. Do not forget that the Lounge is surrounded by the offices of the faculty and that too much noise will disturb their work. And another thing: in the lounge, everything is in its place. Let's keep it that way.

(Continued on Page 5)

## Coop Book and The Engineers

The Engineers this year are behind the COOP BOOK as they never were before. They are really going to put on a drive to see this very important in school event that there is such a thing as a COOP BOOK, and that they know the many advantages of it.

To help you see that it is a book containing eight tickets to eight of the outstanding dances on the school campus, including, and we think featuring, the MEMORIAL Dance. The price is \$.40 (or \$.50 per couple per dance) and you can get them from Council members, and society officers.



Vol. 3 No. 2

Basic Instruction at O. H.

The purpose of this course is to teach you the safe handling of firearms, the fundamentals of gun construction and operation, and the basic principles of good marksmanship. This is the course used by "Coop" students to introduce the O. H. Basic skill range course, now in progress.

This course will take about twenty hours of instruction, and is exactly the same as the basic small arms course used by the United States Armed Forces. The course is sanctioned by them, and is also registered with the National Rifle Association. Graduates will receive a certification upon successful completion of the course.

Coch Persons hopes to be able to give each student individual instruction throughout the course. (Continued on Page 5)

## Schedule

Nov. 29 Wed. Third Year (long)  
Dec. 2 Sat. Activities

Dec. 9 Sat. Engineers Council  
Thru Dec  
Dec. 16 Wed. Sigma Chi (long)  
Dec. 21 Sat. Santa Roca  
Dec. 29 Sat. Merry Christmas

Society meetings and Council meetings  
start at 6:30 p.m.

Short meetings of fraternities start  
at 8:00 p.m. and end at 8:15 p.m.  
Long meetings start at 8:00 p.m.



**DEDICATED TO THE STUDENTS  
OF THE SCHOOL OF ENGINEER-  
ING AND APPLIED SCIENCE**



# MECHELECIV

Vol. 31 No. 1

QUARTERLY STUDENTS' MAGAZINE

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Illustrations by Ayman Jumean

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The content of this magazine represents the individual expressions of the authors or editors and does not necessarily reflect the views or attitudes of the student body or of the University administration.



# LETTERS TO THE EDITOR



THE  
GEORGE  
WASHINGTON  
UNIVERSITY

*Washington, D.C. 20052 / Office of the Vice President for Student Affairs*

Dear Abid:

Thank you very much again for sharing with me a copy of the November-December MECHELECTIV. As we have discussed before, I am one of those people on the campus who is positively delighted to see the efforts you and others have made to bring back the MECHELECTIV.

Ranging through the magazine, that was an interesting letter from the Dean. I thought the article on Fundamental Concepts in Computer Graphics was a good one for a journal designed for professional people, as this one is. The article on the Mini-Baja at CM was fun to read. The article on Industrial Archeology for the Industrial Engineer I found fascinating and well worthy of reprinting from the 1969 MECHELECTIV.

The magazine gave good publicity to the annual Engineering Picnic. I was glad to see the useful article on resume writing for Engineering Students included in this issue. I have to be frank that I found one section of this issue - the "Humor" portion - tasteless, juvenile, and thoroughly discordant with the rest of the contents of a quality journal addressed to professional students.

I was pleased that you asked me to give you my feelings about this issue, Abid, and I think the overall outcome is good. I can see only good coming from the personal efforts that you and others have given to bring about this return of a fine journal. Congratulations on your efforts.

Sincerely,

William P. Smith, Jr.

more on pg. 24

LETTERS TO THE EDITOR POLICY: The opinions set forth in the "Letters to the Editor" page of this magazine are not necessarily the opinions of the staff of the MECHELECTIV. This page is set aside each issue for use by students, alumni, faculty and staff of the School of Engineering and Applied Science. The staff will also accept letters from other sources if the letters concern the magazine or would be of interest to the School of Engineering community. MECHELECTIV reserves the right to edit or omit any letter if lack of space deems it necessary, or if a letter appears to be unprintable in the opinion of the Editorial staff. All letters must be signed; however, pen names may be substituted if requested.



The first issue of MECHELECIV was published last semester. It was well received by the School community. A number of faculty, alumni and students have indicated a desire to contribute towards ensuring the continued publication of MECHELECIV. This response is encouraging. There were also oversights and shortcomings in the first publication that did not escape the attention of our audience. Proofreading will be done more diligently in the future to avoid compromising quality — and of course to avoid embarrassment as well. There was some negative response regarding the humor column. This has been conveyed to the Humor editor.

Based on experience gained during the production of the first issue, we have decided to publish one regular and one supplemental issue each semester. This change will hopefully reflect well on the quality of the magazine and constitutes a more judicious use of our resources. All Engineering students, by virtue of being enrolled in the School of Engineering and paying the Engineers' Council fee get an automatic subscription to the MECHELECIV. The Council allocates the equivalent of \$2.50 per year from every student's council fee towards the publication of MECHELECIV. Students who have not received the first issue in the mail, may want to verify their addresses in the Registrar's office and update them if necessary.

This issue covers a number of aspects of the Engineering School. Photographs and summaries of some of the successful events sponsored by the Engineers' Council are presented. A tongue-in-cheek article by one of our staff highlights some of the facilities which the D-H House offers Engineering students. Professor Douglas Jones has provided an informative description of the soon-to-arrive IBM CAD/CAM configuration — an award granted to G.W.U. as a result of a proposal submitted by Professor Jones and a couple other faculty. The article on the Co-op program describes an alternative opportunity for G.W.U. Engineering students to plan a quality educational program for themselves. Quality education appears to be the future direction of S.E.A.S. One of the other articles in this issue speaks to the importance of a consistent academic honesty code to an overall quality academic program. On a different note, Duncan Mills, an EE doctoral student, offers us a well-written and insightful view of fiber optics applications.

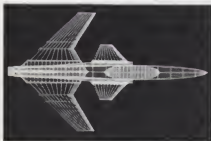
As most of you know, this is the centennial year of the School of Engineering and Applied Science. A number of festivities are planned during the Fall 1984 semester to mark the occasion. MECHELECIV is planning to publish a special centennial issue in cooperation with the Engineer Alumni Association (EAA), scheduled for September 1984. This issue will go out to 10,000 alumni, students and prominent professionals and organizations. This issue will also serve as a test-bed for evaluating the feasibility of setting up a regular annual special issue in cooperation with the EAA. It is hoped that such an issue will contribute towards bringing the alumni and student communities closer together and will keep them informed of interesting events and happenings within the School of Engineering. It will hopefully also inform the School of the opinions and sentiments of its alumni and student communities. We encourage you to submit ideas, comments and articles for our Fall Centennial issue.



Editor



# ENGINEERING TAKES ON EXCITING NEW DIMENSIONS IN THE AIR FORCE.



Computer-generated design for investigating structural strengths and weaknesses.

Developing and managing Air Force engineering projects could be the most important, exciting challenge of your life. The projects extend to virtually every engineering frontier.

## 5 CAREER FIELDS FOR ENGINEERS



Air Force electrical engineer studying aircraft electrical power supply system.

Engineering opportunities in the Air Force include these five career areas: aeronautical, architectural, astronautical,

electrical and nuclear. Hundreds of diverse specialties are included in a wide variety of work settings. For example, an electrical engineer may work in aircraft design, space systems, power production, communications or research. An aeronautical engineer might be included in wind tunnel testing, designing cockpit displays and flight testing.

## PROJECT RESPONSIBILITY COMES EARLY IN THE AIR FORCE



Air Force aeronautical engineers discuss flight characteristics of a fighter aircraft.

Most Air Force engineers have complete project responsibility early in their careers. For example, a first lieutenant directed work on a new airborne electronic system to pinpoint radiating targets. Another engineer tested the jet engines for advanced tanker and cargo aircraft.

## OPPORTUNITIES IN THE NEW USAF SPACE COMMAND



Artist's concept of the DCS III Defense Satellite Communications System satellite. (USAF photo.)

Recently, the Air Force formed a new Space Command. Its role is to pull together space operations and research and development efforts, focusing on the unique technological needs of space systems. You may have an opportunity to join the team that operates superior space systems as the Air Force moves into the twenty-first century.

To learn more about how you can be part of the team, as an officer, see your Air Force recruiter or call toll free 1-800-423-USAF (in California call 1-800-232-USAF). There's no obligation.

## AIM HIGH AIR FORCE

A great place for engineers.



# New CAD/CAM Applications at SEAS

by Douglas L. Jones



CAD: Designing a Mechanical Part Interactively

Since the announcement by George Washington University and IBM corporation in June 1983 that SEAS will be one of twenty recipients of a \$2 million computer-aided design/computer-aided manufacturing (CAD/CAM) system, plans have been moving forward toward installation of the system during the summer of 1984. The recipients were selected from approximately 115 proposals submitted to IBM and evaluated by a three-stage reviewing process similar to that followed by the National Science Foundation. The proposal from SEAS was prepared by Professors Douglas L. Jones, Donald Esterling of the Department of Civil, Mechanical and Environmental Engineering and James Foley of the Department of Electrical Engineering and Computer Science. Extensive preparations have been initiated to install this system on the fourth floor of Tompkins Hall for initial operation during the 1984 fall semester and integration into the 1985 spring semester design classes.

## CAD/CAM Experience at SEAS

For undergraduate students it is anticipated that initial contact with the IBM CAD/CAM system will be for demonstrations in the early design courses in all

engineering curricula. Subsequent advanced design courses and design project courses will be expected to involve considerably more extensive use of the system for design conceptualization and optimization. Through these activities, the students will obtain first-hand knowledge and experience with the productivity gains available through this system.

A considerably more intensive experience will be available for undergraduate students who choose to emphasize design or specifically computer-aided design in their elective courses. Examples of this are the undergraduate elective options in Mechanical Engineering Design and Computer-Aided Design that have been established in the Mechanical Engineering Curriculum.

Because of the extremely rapid developments of CAD/CAM concepts, it appears that graduate instruction and research in CAD/CAM will be expected to expand considerably in the future. For example, the present Master's Degree programs in Mechanical Engineering Design and Computer-Aided Design may be expanded into professional or doctoral degree levels. CAD/CAM applications in structural design and integrated circuit design are also expected to benefit from such advances. Other areas such as interactive computer graphics will also be strongly influenced by and will in turn strongly affect the state-of-the-art in CAD/CAM.



## CAD/CAM Hardware

The CAD/CAM system SEAS is receiving will be based on an IBM 4341 Group II processor with 16 megabytes of main memory, 7.5 gigabytes of disk storage, two high-speed disk drives, 17 high-resolution color graphic CAD terminals (including eight of the newest IBM 5080 color graphic terminals designed especially for CAD applications), and standard support equipment such as printers, plotters, and telecommunications interfaces. In addition to this hardware, a number of smaller computers, such as IBM personal computers and Instrument computers that can be interfaced with the 4341, will be included in this grant.

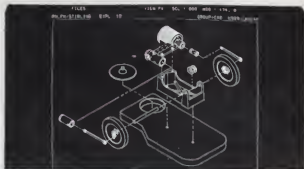
## CAD/CAM Software

A vital part of this grant is the inclusion of several advanced CAD/CAM software packages, including CADAM, CAEDS, CATIA, CBDS2; language support for FORTRAN, APL, PL/1, and PASCAL; the virtual memory (VM) operating system; and a broad range of additional software support applications.

The CADAM (Computer Augmented Design and Manufacturing) system is an interactive graphics system for computer-aided manufacturing and design. The CAD portion of the package is comprised of a high-performance, high-function design/drafting package, together with a number of aids to design analysis. The CAM portion of the system provides capability for numerical control (NC) part programming. The CADAM system may also be used to interface with CAEDS and CATIA for more detailed analysis of structural components and machine parts.

The CAEDS (Computer-Aided Engineering Design System) is an integrated applications software package designed to address the functions and applications of mechanical product development.

CAEDS offers the capability of analyzing component performance in the computer prior to building costly hardware prototypes, thus reducing dependence on more traditional prototype building and testing. CAEDS



Isometric projection

normally uses finite-element models to analyze the prototypes, which leads to improved product quality and performance in significantly shorter time.

The CATIA (Computer-Graphic Aided Three-Dimensional Interactive Applications System) system emphasizes the three-dimensional finite-element modeling of objects for the purpose of optimizing the component configuration. The CATIA system permits direct construction for three-dimensional images and the interactive passing of data to the CADAM system.

Finite-element programs NASTRAN, ADINA and SUPERB are available for the analysis process.

The CBDS2 (Circuit Board Design System 2) system is an interactive graphic, computer-aided design tool to speed the design and manufacture of printed circuit boards. The use of different colors to represent different levels of a circuit board can be easily facilitated on the color graphics terminals and provide a clear visual check of the design.

## Applications

Although recent CAD/CAM developments have had a significant impact on all engineering fields, the greatest amount of activity has been in mechanical engineering, as is seen in Table 1.

This survey also suggests that the changes in applications emphasis are expected to be rather limited through 1987.

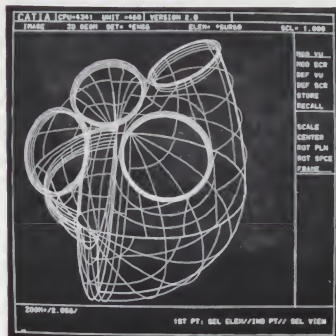
	1982		1987	
Mechanical	\$690	52 %	\$ 4,300	54 %
IC	110	9 %	800	10 %
PC	220	17 %	1,400	17 %
AEC	200	15 %	1,000	13 %
Mapping and Other	90	7 %	420	6 %
TOTAL	\$1,310	100 %	\$7,920	100 %

Table 1. CAD/CAM Revenues by Application\* (Dollars in millions)

\*Source: Dataguest, January 1982



The impact of CAD/CAM applications on engineering productivity is expected to be very great, especially in the areas of Visualization of machine components and their design optimization.



Three-dimensional design of an artificial heart



Modify a "wire frame" model of a connecting rod.



Move an entire suspension in response to a simulated bump with "kinematics."

TYPE	CADAM	vs.	Manual
Design	4.9	:	1
Drafting from Sketch	5.8	:	1
Drafting from layout	8.1	:	1
E.C.	38.0	:	1
Isometrics	13.2	:	1
Charts	4.7	:	1
Composite Average	6.6	:	1

TABLE 2. CADAM Productivity

Table 2 above shows the relative advantages attained through use of the CADAM system in comparison to manual production. The composite average advantage of 6.6:1 reflects the present best estimates of productivity gains, although further improvements in CAD/CAM hardware and software will certainly be expected to extend the already impressive productivity gains. Additional gains will be anticipated through better integration of the design and manufacturing activities into a common engineering data base.

The arrival of this exciting configuration of IBM hardware & CAD/CAM software will mark a valuable expansion in the hands-on experience SEAS will be able to provide its undergraduates and graduate students. The extent of expected future CAD/CAM applications are uncertain, but if the developments in recent years (out pacing all expectations) are any indication, the changes in the next 10 years will be exciting and profound, changing the pace of engineering developments to a much greater degree than any experienced in the earlier parts of this century. SEAS students will be part of these developments.



# Fiber Optics Comes of Age

by

**Duncan Mills**

Leafing through a copy of Newsweek last autumn, I came across an advertisement which included a photograph showing a thin strand of transparent material, along with the headline: "This is our new single mode optical fiber. It is thinner than a human hair and able to carry on several thousands conversations at once!"

I suppose it is easy for an engineer to be *blase* about such hype; after all, most of us are involved with the design of high technology on a routine basis. Nonetheless, this was the first time I had seen anybody flaunt fiber optics in a "popular" journal, and when one considers that high technology, at least in the popular imagination, is manifested in Pac-Man and Donkey-Kong, I took this full-page spread as a sign that fiber optics has finally "made it." A major communications firm had decided to spend a healthy sum of money to tout a system that is changing the way we communicate.

Just how does an optical fiber work? The fiber itself consists of a cylindrical core of dielectric material — usually fused silica (quartz). This core is surrounded by a coating of slightly different dielectric with a refractive index lower than that of the core. This layer is referred to as the cladding. Light travels down the fiber by exploiting the principle of total internal reflection, that is, by bouncing off the interface between the core and the cladding.

The radiation of power which travels down the core in this manner constitutes what is known as the pro-

pagating modes. Of course, in digital communications systems, where fibers have their major application, these propagating modes actually comprise digital pulses from a laser source.

Alright, you say, but the principle of total internal reflections has been known for a few hundred years. In fact, a search through patent office files will reveal fiber optic inventions (based on total internal reflection) dating back to the 1800's. One enterprising dentist, for example, formulated a scheme for a fiber optic lamp to illuminate the mouths of his patients. (Unfortunately, this dentist, and others like him, probably never collected a penny for his invention.)

What, then, took fiber optics so long? There are a number of answers. One reason is the quality of dielectric materials. Amazing as this may seem, prior to 1970, dielectric materials were much too lossy — that is, they absorbed too much power, to make suitable transmission lines of any length. The culprits were hydroxyl ions and other water-based impurities in dielectrics which caused absorption resulting in huge power drops in excess of 100 dB/km. Largely due to removal of these impurities, the latest fibers have losses under 1 dB/km.

Actually, optical fibers do not achieve these low losses at all frequencies. Rather, there are low loss "windows" at light wavelengths of 850, 1330, and 1550 nm. This brings us to another reason for the recent rise in optical fiber communications: laser sources. Developing laser sources that would operate efficiently at these "window"



wavelengths was a major task. Early lasers were plagued with stability problems causing periodic fluctuations in their light output. Needless to say, these fluctuations were a headache to communications engineers attempting to send reliable, high speed digital pulses. Early lasers also had relatively short lifetimes, necessitating their removal at frequent intervals.

The specific laser sources that have proven almost ideal for optical fiber channels are semiconductor devices known as injection lasers. These are compact and lightweight (but expensive) and are exceptionally stable. They also have other advantages. They can be switched at very high speeds, resulting in a high data rate. Furthermore, they radiate in a very narrow frequency band. All light, no matter how red, blue, or green it may look, is actually composed of a discrete set of frequencies which lie within a certain spectral range. As light travels through a dielectric, the various frequency components travel at slightly different velocities, i.e., they disperse. Hence, a digital pulse composed of this light will tend to spread out. If the pulses are spaced close together (as they will be in any high data rate system), dispersion will cause them to overlap, resulting in a garbled message. This type of dispersion is known as chromatic dispersion. Clearly, a source such as an injection laser, with a very narrow spectral range, will help eliminate this problem.

Let us return to the fiber itself. There is another type of dispersion, known as modal dispersion, which arises as follows. Remember the propagating modes? A digital pulse may excite many of these modes. Similar to the spectral components described previously, each mode travels at a slightly different speed, and once again the pulses will tend to overlap. To understand the remedy for this, one should realize that the number of modes a fiber can actually carry will depend on the diameter of the core and the wavelength of light transmitted. The larger the core and the smaller the wavelength, the more modes can be "squeezed" into the fiber. Modal dispersion can be completely eliminated by propagating only one mode. Such single mode fibers can be manufactured by simply making the core diameter small enough. In most cases this means only a few microns – on the order of a human hair.

With the reduction of dispersion and the development of reliable sources, optical fibers really come into their own. They have extremely high bandwidths (this translates to many simultaneous conversations) and transmit at high data rates. In more starkly commercial terms, this means that they carry on a lot of talk. This has great attraction for the communications industry – particularly long-distance telephone services, for whom talk is their bread and butter. Such firms as AT&T, Sprint, and MCI are locked in fierce competition battles to implement long distance fiber systems. The latter has actually worked out a deal with Amtrak whereby trackside property can be used to lay optical fiber cables. Customers needn't worry about the Metroliner disturbing their phone conversations, though. Optical fibers are quite immune to the effects of vibration.

They have other advantages, too. They are small,

lightweight, and immune to electromagnetic interference from nearby electronics. Traditional coaxial cable cannot claim these features. Fibers are free from the corrosive efforts of salt water. This has made the Japanese, in particular, very happy. They have embraced the optical fiber with the same enthusiasm they showed for the transistor. Metropolitan Tokyo is now surrounded by a fiber optic communications network which includes cables under Tokyo Bay. Finally optical fibers are very difficult to tap into. What effects this will have in the political arena, one can only speculate!

The recent announcement by Bell Laboratories of successful tests involving the c-3 laser, which emits at a single frequency and can be modulated at very high speeds, virtually guarantees that fiber optics is here to stay. Using this laser, the research team reports the successful transmission of data at a rate of 420 Mb/s over a 161.5 kilometer optical fiber channel with an error rate of only 5 per 10 billion bits. What does this mean to the graduating engineer at GW? With this system, the entire contents of all the textbooks that that student used at GWU, plus the Standard Engineering Handbook (plus, for good measure, a couple of comicbooks), could be transmitted from here to Philadelphia in one second. The error? In 10 to 20 such sets sent, one partial derivative may have been erroneously printed as a full derivative.

In any event, if the long distance phone systems have their way, the next time some student calls home for money or a care package, his/her voice – or a modulated pulsed and digitized facsimile of it – may be travelling over an optical fiber.

---

Prof.: "You missed my class yesterday, didn't you?"

Stud.: "No sir, not a bit."

□□□

Prof.: "Well, what did you think of the course?"

EE.: "I thought it was very well covered. Everything that wasn't covered during the semester was covered on the final."

□□□

A customer sat down at a table in a smart restaurant and tied a napkin around his neck. The manager called the waiter and said, "Try to make that man understand as tactfully as possible that that's not done here."

The waiter approached the customer and said, "Shave or haircut, sir?"

□□□

I serve one purpose in this school  
Upon which no one can frown;  
I quietly sit in every class,  
And keep the average down.

□□□

FAMOUS LAST WORDS: "Hell, he won't ask us that."



# Engineers'





# Week









# Engineers' Week Contest

## Winners

### Popsicle Stick Bridge Building Contest

<b>First Prize</b>	<b>Christian Oelsner and Ted Dellanides</b>
<b>Second Prize</b>	<b>Mark Levine</b>
<b>Third Prize</b>	<b>Jacques Martinod and Esteban Hurtado</b>

### Ice Cream Eating Contest

<b>First Prize</b>	<b>Ali Vassetizadeh Ali Amighi</b>
<b>Second Prize</b>	<b>Mong-Hong Edmund Wu Amy Proud</b>
<b>Third Prize</b>	<b>Amir Hali Babit Wanis Sand</b>

### Tug-Of-War

Members of the winning team were:

John Green  
Chuck Koenig  
Sam Voynow  
Gisou Haghighat  
Afsoun Haghighat  
Edmund Peaslee  
Edmund Wu  
Esteban Hurtado  
Mark Engel

### Egg Drop Contest

<b>First Prize</b>	<b>Ted Delinides</b>
<b>Second Prize</b>	<b>Kiat Cheong Toh</b>
<b>Third Prize</b>	<b>Ken Blum</b>
<b>For Aerodynamics</b>	<b>Jamshid Irdmusa</b>
<b>For Aesthetics</b>	<b>Kiat Cheong Toh</b>

### Judges

**Dean Harold Liebowitz  
Associate Dean James Feir  
Professor Donald Gross**





# Co-operative Education at SEAS

By

Frank Wood

Personnel officers and operating level supervisors will often note that many newly hired college graduates lack the practical know-how required for quick and easy assimilation into the "real world" work force. This may be particularly true of graduating engineers. Most strictly academic engineering programs leave little room for technical, "hands-on" experience, yet soon after graduation, entry level engineers find themselves working with experienced technicians, craftsmen, and other engineers on projects requiring some "hands-on" background. Accordingly, they spend varying periods of time playing catch-up.

But students do have an alternative. Around the turn of the century a few engineering schools adopted a system requiring engineering students to work in an area related to their studies for specified periods during their undergraduate years. From a small beginning at the University of Cincinnati, this program (called Cooperative Education because it requires cooperation between academe and industry) now involves more than 500 institutes of higher education in the U.S. and more than a half million students of all disciplines.

The basic principles and objectives of "Cooperative Education" are now understood and practiced to varying degrees by all large and most medium and smaller sized business, industrial, and research organizations -- spreading from its origins in the engineering field to business and, more recently, to the liberal arts fields as well. It began as a system in which full-time work periods alternated with academic periods, but in later years two year colleges and even secondary schools adopted cooperative programs on a "parallel" basis, i.e., work periods which were scheduled daily, after school. In the latter cases, academic credit is sometimes granted for the work experience.

In the last 10 years, the Cooperative Education in Engineering Program at GWU's SEAS evolved from 19 students and 3 employers to 80 students with 42 employers. The SEAS Cooperative Education Program utilizes a voluntary, alternating, non-credit system. In,

theory, two extra semesters -- along with the summers -- of full-time paid work as an engineering assistant, are required after the sophomore year. In practice, because of different student situations, such as transfer students with varying numbers of credits, variations in work/study schedules with the employer's permission, are arranged. Normally, Co-op students need five years to complete a degree program.

SEAS Co-op students have a particular status during their "working semesters." They do not pay tuition, but they must be "continuously enrolled." For the purposes of housing and campus privileges, they are "full-time students." University controlled scholarships and certain other financial aid means are held over until the next full academic semester.

A recent analysis of the estimated costs of an undergraduate engineering degree at SEAS, and how those costs might be met by a co-op student, showed interesting results. The analysis covered a typical co-op student over a five-year span, beginning school in September, 1984. The study assumed that both income (wages and tuition aid) and outgo (tuition, room, and board) increased each year at an estimated inflation rate, and that the student was from out-of-town and occupied the GWU dorm system all year. Conclusions of the analysis were the following:

- 1) Total co-op income from wages amounted to approximately \$30,000.
- 2) Total co-op assistance (not guaranteed -- but 75 % possibility) could amount to an additional \$12,500.
- 3) During the last three years of the program, a SEAS co-op, with both wages and assistance, should be able to meet 90 % of school and living costs.

An additional note: a student who lives at home, either during academic periods or work periods, or both, would face a much lower cost.

These conclusions make the Co-op Program attractive for financial reasons besides for the valuable learning experience the program provides.

SEAS Co-op students work for a large and diverse



group of employers, who have learned to rely on the steady supply of young, professional level talent for their organizations. Most employers are more interested in a student's motivation and academic standing than previous work experience, although the latter does aid in the selection process. Students with marginal (barely passing) records usually are not selected. To be selected as a co-op, the student's major must be relevant to the job, and the student must be "predictive of graduation." Once accepted, co-op students owe some loyalty to their employer and should consider, very carefully, working for that organization after graduation. In actual practice at SEAS, more than one-half do so.

A co-op in the GWU SEAS Cooperative Education in Engineering Program can benefit from the proximity to some of the world's largest and most comprehensive research and development laboratories. Considerable state-of-the-art basic and applied research in many fields of science and technology is underway in this vicinity, by government-established laboratories, private contractors, and by the privately owned establishments that support them. Pre-eminent among these are the National Bureau of Standards, the Harry Diamond Laboratories, the Naval Research Laboratories, and the Goddard Space Flight Center of NASA, each of which has hundreds of engineers assigned.

Since these resources are in our own backyard, and since the U.S. Government has a large, well-structured co-op program, 80 % of SEAS co-ops work for the U.S. Federal Government (employment which is limited to students of U.S. citizenship). Most operating level supervisors in government laboratories have handled student trainees before; they know what the objectives of the co-op program are; and they challenge their co-ops accordingly.

From the beginning, a co-op student trainee working for the U.S. government is a federal civil servant; he or she starts to earn retirement credits, is eligible for federal health plans and credit unions, and upon graduation can be appointed, on a non-competitive basis, directly into a full-time position. These full-time positions are usually in "professional development programs," an almost guaranteed promotion ladder which in two years gives a young engineer parity with his/her classmates in private industry.

Most, but not all, governmental agencies grant additional assistance in the form of tuition aid. This usually amounts to one half of the tuition and fees remaining from the time the student begins as a co-op until graduation. A few highly selective programs offer full tuition. Students who accept such assistance are committed to work for that agency for a period equal to that for which they have received assistance -- generally no more than one additional year.

Private contractors, corporations, utilities, and research organizations also have co-op programs. Normally they deal in smaller numbers and select only a few superior students for specific missions. Currently, SEAS has co-op students with IBM, "E" Systems, Digital Equipment, EDS, and Dupont, among others.

Work projects involving co-op students are as varied

as the employers. Some examples include the following:

1) in the field of Mechanical Engineering -- assisting in depot overhaul of ground support equipment for the U.S. Marine Corp; working on a thermal model of a telescope to be used in the Space Shuttle Program; assisting in the bench test assembly and development of the PROCO control system and the machining, fabrication, and building of the PROCO single cylinder engine; 2) in the field of Civil Engineering -- assisting in design of electronic instrumentation for the use in experiments for road pavement profile testing; conducting research analysis (resulting in a paper to be presented at a Conference), dealing with long shore and cross shore sediment transport as well as foreshore slope and grain size relationships; and 3) in the field of Electrical Engineering and Computer Science -- developing an interactive graphics software package, integrating and testing an analog processing system; participating in the installation of superconducting electric machines on the Jupiter II testcraft which involved solving a number of problems in instrumentation, cryogenic support, etc.

A very high proportion of past and current co-op students at SEAS have made very favorable comments about their work experiences. Many have indicated they would not be at GWU if it were not for the Co-op Program. A sophomore co-op in Mechanical Engineering had this to say about his co-op experience:

"The most rewarding project I worked on was the development of five 14-hour timers for the AIA system. With my supervisor's help, I redesigned the existing timer schematic, built a prototype, designed the timer's printed circuit boards, and ultimately fabricated and tested the timer. The design also involved meeting size constraints for the module as a whole. This project allowed me to follow and participate in every phase of the product's development. When everything checked out I felt a real sense of accomplishment. It is quite satisfying knowing that I hold a good deal of the responsibility for producing such an integral component."

The quality and diversity of work experiences in the SEAS Co-op Program continually improves. Graduates from the school with co-op experience continue to find themselves with certain advantages over graduates without co-op experience -- such as assured jobs, better pay, and quicker promotion prospects. Employers continue to benefit from the fresh supply of young talent. Barring severe governmental cutbacks, or a deep recession, the Co-op Program at SEAS should continue to grow at the present rate, through the next decade and beyond.

Full-time SEAS undergraduates who are not seniors and who have a grade-point average of at least 2.3 are encouraged to apply for the co-op program. Applications should be submitted at least two months before the co-op position is to start, i.e., the beginning of a session in either January, May, or September. Any one interested in additional information should see Mr. Frank Wood in the Co-op Office, Room 307, Tompkins Hall. Prospective employers seeking co-op students in the fields of Civil, Electrical and Mechanical Engineering, or in Computer Science and Operations Research should call Mr. Wood at (202) 676-6158.







# The Dark Side of GW's Engineering Education

by

**A. Morality**

If you are affiliated with the Engineering School, especially at the undergraduate level, academic dishonesty is familiar to you either through observance or through indulgence. Last semester, a memorandum was circulated by the administration to all faculty in response to complaints from students that the matter was not being adequately addressed. Yet the situation is essentially the same. In response to continued complaints by the students, the Engineers' Council again discussed the matter both with the Dean and with the Department of Electrical Engineering and Computer Science, the source of many of these complaints. Even though the administration is sympathetic, it shows no sense of urgency in dealing with this matter, citing "limited resources" as the reason for its inaction. Some of the more problematic aspects of this situation are presented here to encourage discussion of these issues with the object of eliminating conditions that lend themselves to academic dishonesty.

There is a general perception amongst the faculty that cases of academic dishonesty are dropped often because of a reluctance on the part of the administration to get involved in any sort of controversy. Current procedures for dealing with academic issues exclude the faculty from any significant role in decision-making. This lack of faith in these procedures leaves the faculty somewhat reluctant to pursue such cases and has contributed towards creating a perception that "cheating is safe."

It is therefore important that we have a balanced and consistent "Academic Honesty Code" that assures a fair, effective and swift process of handling cases of academic dishonesty. A document addressing this

need is being considered by the Joint Committee of Faculty and Students and will be forwarded to the faculty senate for approval. This document has been in the works for many years and is well thought out and complete. The School of Engineering should consider this document as an alternative to its current procedures.

Overcrowded classrooms also contribute to the problem. Proctoring examinations in such conditions becomes difficult with students being unable to effectively conceal their work from others. The situation is often made worse by the inappropriate assignment of small rooms for large classes. Limiting class sizes will help alleviate this overcrowding.

It is common knowledge that a student entering the Engineering School has available for his or her use, assignment solutions and project reports from previous years. It is also common knowledge that many instructors repeat their class assignments year after year with little or no change. This substantially undermines the importance of assignments both as a learning tool and a measure for evaluating student performance.

The School community should address the issue of academic dishonesty if it desires to enhance the quality of education here.

With cooperative effort the problem can be addressed: by establishing the balanced Academic Honesty Code mentioned above; by keeping a commitment to limit class sizes; by the faculty taking an active role in pursuing cases of dishonesty, and in altering assignments and exams from year to year to make cheating more difficult; and by students actively reinforcing the attitude that cheating is unacceptable among peers.



# D - H HOUSE

by

Ayman Jumean



\*\*\*\*NOTICE\*\*\*\*

From one student to another

This is my story for all to read  
and my advice that all must heed  
It's full of good news that's overdue  
and it is mainly a benefit to you.  
It is a Tale that I do tell  
about a house, to you, I sell  
So here begins my tale.

It has come to my attention that there are students and others out there in the GWU Engineering Community who are unfamiliar with the D-H House and the range of facilities and organizations housed within it. Thinking to myself "Mon Dieu," I put pen to paper immediately to correct this situation. The world, or at least the part

of it touched by this magazine, should know the story of D-H House: our refuge and our source of service, of student freedom, and of good times.

Wherever college students can be found, student getaways, hideaways, pubs, lounges, organization offices, and recreation rooms can be found. College



students, away from childhood homes, need new places to relax in, places in which to feel at home. The students in the GWU School of Engineering and Applied Science are no exception.

Once upon a time, many many years ago, this group of students felt lost, alienated, with no sense of belonging. They did not have a place of their own, somewhere they could escape, relax, create for themselves, feel proud ownership of -- a place over which the administration had no control, no watchful eyes. They had room (and they still do) called the student lounge. But students could not "get away from it all" there -- not with classrooms, faculty and administration on every side of them, and no music, no TV, no recreation of any sort really available. It was primarily token space given to the students by the administration, and it was only big for 8 to 10 students at a time to sit around and down a cup of tea or coffee. I imagine the administration at the time felt giving the students the room was ample demonstration of their concern for student needs, and at the time students did not feel like indicating otherwise.

At any rate, after a time the president of GWU dedicated a house in honor of two gentlemen. These two saviors were called Mr. Davis and Mr. Hodgkins. The engineering students got a whole house in which to lounge, reserved for SEAS students only. The house was called the Davis-Hodgkins House (D-H House for short).

D-H House is older than Tompkins Hall. The first house was on 22nd street where the library now stands. The University thought that a library was more important than D-H House. Very silly, is it not? But they knew better than to outphase the house. Instead the university offered a new building on Eye Street. It too was moved. It is unbelievable that it was moved twice, but it is true.

The second time it was replaced by the Academic Center. As a SEAS student, I could understand where a library might be chosen over D-H house, because there are a lot of non-engineering students and once in a while you have to consider them. Building them a library was a bit much but the thought that the academic center was more important than the 2nd D-H house astounds me! The third D-H house was a house in shambles on 22nd & G street. It is less of a shambles now through the efforts of the Council but still there is a lot more to do -- for instance, cleaning the outside of the house. In working through the proper channels to get this task accomplished, the Council has learned the valuable lesson of how bureaucracy works.

If you are a SEAS student, you have facilities and services accorded you in D-H House. Your are paying for these; you may as well take advantage of them and get a return on your investment. For instance, typewriters and a photocopier are available for the use of students -- free of charge. There is a limit on photocopies per person -- due to the cost of supplies, and there are limited hours of photocopier availability -- due to lack of volunteers. There is a refrigerator to keep your lunch from spoiling and a microwave to heat your food. A coke machine is also available to all and free use of a telephone. Coffee and tea are served constantly

throughout the day.

And there is more: there is a TV room where you can relax after class and listen to your favorite program. You might watch the news in the evening after a long day of classes. If you are an early bird, you can watch "Good Morning America." You might watch your favorite Soap between your classes. In D-H House you can truly "lounge."

And that is not all D-H House has to offer. There is a music room and a library. The music room is meant for students to listen to their favorite radio station, or to play a record or a tape of their own. The library cabinet holds reference materials that SEAS students might need when they do homework (it does not compete with Gelman Library, of course). The library cabinet consists of books donated to the Engineers' Council by individuals (hint, hint! If you have books that might be useful please drop them off at D-H House!). D-H House is meant primarily for relaxation and rest from studies, but there is a study lounge available where SEAS students could meet to study.

Let me hasten to write that D-H House is more than just another oversized student lounge. It is the base for the Engineers' Council, which is the elected representative body for Engineering & Applied Science students. The Engineers' Council tries to function to its best ability in the interests of the students. So if you have any suggestions or complaints, or are seeking advice, about anything affecting SEAS students, come to the Council. We have experience handling complaints, acting as liaison with the administration, and we welcome suggestions. We hope our experience and ability knowing who to approach (or who to avoid) will solve any problems you may have. SEAS students need a dependable council, and I would like to think that the students have a dependable council now. And it is there for your benefit.

Another important part of D-H House is the fact that within its mighty walls rests the publication offices of MECHELECIV. For those that are a bit simple minded MECHELECIV is the magazine you are reading now. (It's true -- turn to the front cover and check.) The office of MECHELECIV is room 203 on the 2nd floor of D-H House. This room is the main office where all the work on the magazine is coordinated. Here the Editorial Board looks at walls, decides whether to drink coffee or tea, and rack their brains over which is the best way to tell some poor soul, who spent hours on an article, that it can't be printed because -- it just can't. The office is the main focal point of the magazine, because layout, organization, mailing, and editing is done in the room. D-H House has been the base for MECHELECIV since its earlier days.

D-H House is also a communication node for all students. Notices, about events that concern SEAS students, are all over the house. Sign-up sheets for field trips are usually posted in D-H House. SEAS students could find a notice about a firm that is looking to hire a part-time student or even a full-time student for a part-time job. If you want to sell something you may leave a notice in D-H House for all SEAS students to see. There



might be a bargain that you have been looking for, for many years. No notices for dates or for companionship if you please, though D-H House can be a meeting place. And you never know - you might bump into a new friend in D-H House.

D-H House is totally controlled by the students. It is maintained and upkeep by students. It is opened and closed by students. If more students volunteer their help, the house will run even more efficiently. "Believe it or not."

Watch out for the D-H House Secret Police. Their job is to arrest any person who violates the holy rules of D-H House. There are only a few rules to remember, so memorize them because you might be tested on them. The first rule states that there will be NO SMOKING in the house at any time. Smoking in the house causes a major fire hazard. The second rule is keeping the house clean. This means don't throw trash on the ground and don't put dirty shoes or any food on the couches. The third and final rule is that you should carry your GWU ID card (if you are a student you must also carry your current registration card), because before you use some of the facilities that are available at the house, you will be asked to show your cards. The yellow registration card proves that you are a SEAS student and the GWU ID proves that the registration card is yours, not somebody else's. This is not to harass but to protect. As a SEAS student you pay more than some of the other students and therefore other students should not be allowed to use the supplies paid for by SEAS students.

I am very tired and weary, and feel like telling my pen to stop, but I still have more to tell you, so read on. The

Engineers' Council is improving the house for your benefit. So take time and tell the Council if you have any suggestions that you think might be useful. Also volunteer some of your time if you have any to help run the house.

The Council has many ideas in the works. One of the ideas the council is thinking about is to bring a micro-computer to the D-H House. Also the Council is trying to get the outside of the house cleaned. This is a very costly job - therefore we are trying to convince the University to pay for the renovation. It behooves the University to have all of its buildings have a nice and clean appearance. Another idea in the works is to see if the basement in the house can be improved and cleaned to make it useable. This may serve as another study room or a new game room, with table tennis, pool table and other games. This idea depends on what plan the student response supports. We are working on getting a food machine in the house. We also subscribed to some magazines for the students to read while relaxing in the house. Some of these on order include Time, National Geographic, People and others. There are also some technical magazines which have been donated by people. So come and be educated, this is the path to KNOWLEDGE.

Now let us get serious. The sole intention of this article is to attract your attention to the existence of Davis-Hodgkins House. If by now you have not realized the purpose of this article and you don't plan to drop by D-H House then I do not care because you are the loser, not I. "SEE YOU AT D-H HOUSE."

OHI I must stop and stop I will  
This is the end of the Tale I sell  
I told you all with no deceit  
The D-H story is here complete  
If you are left with any questions  
Or you want me to hear your suggestions  
Come to the house in your own free time  
And I will listen to your story line  
Now I leave you and wish you good morrow  
But I say come to the House and never be sorrow.



"No! Only GW is Open"



## Eddy and Anne

At time (t) equals zero there lived in a small cavity in a dielectric a poor struggling dipole by the name of Eddy Current. He was deeply in love with a beautiful double layer by the name of Anne Ion, the daughter of an influential force in the town, Cat Ion. Anne was the center of attraction of the young dipoles of the town; her golden curls, her symmetric line integrals, and her harmonic motion affected the susceptibilities of all the bright sparks. However, her father, a rich magnet and power factor, had laid down a strict set of boundary conditions for her future husband.

Eddy's first contact with Anne came at time (t) equals (a). As he passed by a beauty parlor on his periodic orbit, he saw her have a standing wave induced in her filaments. He himself made a fine sight in his beautiful doublet, and it was a case of mutual polarization.

Then by a coincidence, they met at a dissipation function the following night. After a few oscillations to the strains of a number (n) by Mo Mentum and his Incandescent Tuning Forks, the couple diffused into the field outside. There on the Wheatstone Bridge the young dipole felt an impulse to discharge the feelings in his heart. "Gauss, Anne, you are acute angle. I am d(terminated) that U shell marry for I sphere that I'll never be happy without you."

"O, Eddy, don't be so obtuse," said Anne merrily. "We have only just started to integrate."

"Anne, are you trying to dump my oscillations? Can't you see I am in a state of hysteresis over you?"

"Now, Eddy, be a discreet particle. You know my parents must approve."

Eddy did not allow her reluctance to phase him, for he knew it was only a surface charge. "I admit I only get paid a low calorie in my present position, but I have potentialities and I am sure money can't BTU of any importance compared to my love."

Alas, there was also in this cavity a mean dipole who was equally resolved to marry Anne, using coercive force if necessary. Hearing the couple murmuring, he went Pi-l'd with fury and crept stealthily upon them with velocity V, his joules drooling with the bestial erg which moved him. "Low Schmidt!" cried Anne.

"What the infra-red are you doing here—you flat-bottomed vial villian?" demanded Eddy.

The situation grew tensor. Schmidt advanced to choke the beautiful coil. Eddy offered resistance (R); his capacity (C) for absorbing the charge (Q) was low, and Schmidt suffered little lost work content in knocking him out to infinity with a severe blow on his negative charge. In a noble act of self-defense and courage, Anne interrupted her own current and her inductance (L), shooting her voltage (V) to infinity in order to maintain the current (C), and blinding vial Schmidt. Eddy then made a quick comeback with acceleration (a) stripping off Schmidt's outer electrons; this so upset the villian's equilibrium that he was converted into cosmic radiation and vanished in the realms of space, leaving Eddy and Anne the resultant

vectors in the combat.

Old Cat Ion, attracted to the spot by Schmidt's oxidation, beamed upon the young dipole. "Brave young lad," he emitted, "you have satisfied the boundary conditions and by the theorem of uniqueness are the only one for my daughter."

"Our love will not be transient," said Anne, as Eddy formed a closed circuit about her. "And darling," she murmured, "We will raise a one parameter family of second order infinitesimals."

As time (t) approached infinity, Eddy and Anne lived happily.

## *The following was written over 50 years ago!* **THE ENGINEER - A PARABLE** **By D. B. Steinman**

President, National Council State Boards of Engineering Examiners (1931-1932), and President, New York State Society of Professional Engineers (1930-1933).

One day three men, a Lawyer, a Doctor, and an Engineer, appeared before St. Peter as he stood guarding the Pearly Gates.

The first man to step forward was the Lawyer. With confidence and assurance, he proceeded to deliver an eloquent address which left St. Peter dazed and bewildered. Before the venerable Saint could recover, the Lawyer quickly handed him a writ of mandamus, pushed him aside, and strode through the open Portals.

Next came the Doctor. With impressive, signified bearing, he introduced himself: "I am Dr. Brown." St. Peter received him cordially. "I feel I know you, Dr. Brown. Many who preceded you said you sent them here. Welcome to our City!"

The Engineer, modest and diffident, had been standing in the background. He now stepped forward. "I am looking for a job," he said. St. Peter wearily shook his head. "I am sorry," he replied; "we have no work for you. If you want a job, you can go to Hell." This response sounded familiar to the Engineer, and made him feel more at home. "Very well," he said; "I have had Hell all my life and I guess I can stand it better than the others." St. Peter was puzzled. "Look here, young man, what are you?" "I am an Engineer," was the reply. "Oh yes," said St. Peter; "Do you belong to the Locomotive Brotherhood?" "No, I am sorry," the Engineer responded apologetically; "I am a different kind of Engineer." "I do not understand," said St. Peter; "what on Earth do you do?" The Engineer recalled a definition and calmly replied: "I apply mathematical principles to the control of natural forces." This sounded meaningless to St. Peter, and his temper got the best of him. "Young man," he said, "you can go to Hell with your mathematical principles and try your hand on some of the natural forces

*continued on pg. 24*



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Year in College \_\_\_\_\_ GPA \_\_\_\_\_

Major/Minor \_\_\_\_\_

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# LATEST FROM HEADQUARTERS

Another year of Engineers' Council activities is drawing to a close. The past year has witnessed renewed activism on the part of the Council, focused on a number of aspects of campus life. One of the first commitments the Council took upon itself was to make the Council more visible -- by improving its image throughout the University community, and by improving the quality of events organized by the Council and the services it provides for the Engineering students. Consequently, the Council initiated efforts for a major uplift of the Davis-Hodgkins House. As a result, a total of over \$15,000.00 was spent on this project during the course of the year, by the Physical Plant Department and by the Engineers' Council. Because the D-H House was allowed to deteriorate to such a poor state over the years, most of these funds were spent in taking care of the more pressing items like rewiring, replacing floors, recarpeting, etc. It is hoped that if the School of Engineering makes good on its one-time offer to contribute towards the external uplift of the D-H House, the Council and the Physical Plant will be able to arrange for "sand-blasting" the building, thereby lifting it out of its current ghostly appearance.

In connection with this work on the D-H House, for the first time in many years the Engineers' Council entered into a direct working relationship with the Physical Plant Department (an alternative to dealing with them indirectly through the Research and Resources Office in the School of Engineering). In retrospect, this direct contact was a judicious decision on the part of the Council and was reciprocated by the Physical Plant authorities. It resulted in increased efficiency and clarity of work requested and executed. The Council should in the future ensure continuity of this good working relationship with the Physical Plant Department.

The Engineers' Council has also initiated a number of activities aimed at informing the student community of academic and administrative matters that affect them either directly or indirectly by their influence on School and University life. In this regard the revival of the MECHELECIV has been one of the substantial undertakings of the Council this year. In a diverse and fragmented community such as ours here at GW, a magazine like MECHELECIV is invaluable for purposes of dissemination. Information and introducing an element of cohesion. Through its circulation it has served to bring together various segments of the School, including faculty, students and alumni. Certainly, in the School of Engineering, MECHELECIV provides the only unified forum of its kind. The Council hopes that students, faculty and alumni will help sustain this effort by contributing to the magazine and using its facilities to express opinions or initiate discussion.

In addition to all the new activities that the Council initiated during its year in office, every effort was made to improve the quality of existing activities. The Annual

Engineering School Picnic, sponsored jointly by the Engineer Alumni Association (EAA) and the Engineers' Council, was a tremendous success, despite somewhat disappointing weather. Increased publicity accounts for a large part of this success. Engineers' Week this year had good participation from the students. The week-long event was held from February 6 - 11 this year and included a number of interesting lectures, demonstrations and competitions. For the first time, a bridge-building contest was started. This, together with the traditional contests such as the tug-of-war, the egg-drop contest and the ice-cream eating contest were well attended. Better publicity in the future would help the quality and attendance of such events even more.

The Annual Engineers' Ball was attended by about 750 Engineering students and their guests. A sizeable number of faculty and alumni also attended this function -- the biggest of its kind in the University, and a tradition of the Council and of the School for over half a century. The success of this year's Ball made the special effort put into organizing it well worth it. For the first time in many years, the Council presented certificates of appreciation to students, faculty, staff and alumni for their service to the Engineering School student community. It is hoped that this token of appreciation of those who help the Council and the students, will become a permanent feature.

The Council left some work unfinished. The Council spent a substantial amount of effort and time convincing both the School administration and the Budget Office in Rice Hall to set up a formal (and easy-to-operate) procedure to manage the Engineers' Council funds (including funds allocated and earned for publishing MECHELECIV). Despite one written and numerous verbal commitments, the relevant officials have taken over two years pondering over the implementation of such a procedure. The Research and Resources Office did finally issue a document April 10, 1984, but the document does not reflect the agreements reached between Council and University officials. Procedures for managing MECHELECIV income and expense accounts are also not addressed in this document. The Council will therefore continue in its efforts to develop a more complete document in conjunction with the involved officials while bracing itself to deal with the budget problems of the kind the it has experienced in the past.

Office bearers to the 1984-1985 term of the Engineers' Council have recently been elected and have assumed office. The new members of the Council's executive branch are:

President	: Ayman Jumean
Secretary	: Aaron Chibert
Treasurer	: Houra Rais
Assistant Secretary	: Dina Halasa
D-H House Manager	: Esteban Hurtado

The Council will continue to build upon its work from last year. Your participation will make its task easier and more rewarding.



## Lite Bytes *continued*

there!" "That suits me," responded the Engineer, "I am always glad to go where there is a tough job to tackle." Whereupon he departed for the Nether Regions.

And it came to pass that strange reports began to reach St. Peter. The Celestial denizens, who had amused themselves in the past by looking down upon the less fortunate creatures in the Inferno, commenced asking for transfers to the other domain. The sounds of agony and suffering were stilled. Many new arrivals after seeing both places, selected the Nether Region for their permanent abode. Puzzled, St. Peter sent messengers to visit Hell and to report back to him. The returned, all excited, and reported to St. Peter:

"That Engineer you sent down there," said the messengers, "has completely transformed the place so you would not know it now. He has harnessed the Fiery Furnaces for light and power. He has cooled the entire place with artificial refrigeration. He has drained the Lakes of Brimstone and has filled the air with cool perfumed breezes. He has flung bridges across the Bottomless Abyss and has bored tunnels through the Obsidian Cliffs. He has created paved streets, gardens, parks and playgrounds, lakes, rivers, and beautiful waterfalls. That Engineer you sent down there has gone through Hell and has made of it a realm of happiness, peace and industry!"

## Letters to the Editor *contd.*

Dear Mr. Kamran,

I would like to congratulate you and your staff on a job well done. I was very impressed by the Nov/Dec '83 issue of *Mecheleciv*. The quality was impeccable. It gives me great pride and honor to know that a magazine of such excellence is published in my University. I am only sorry that I don't have any time to help on this magazine. I hope that the high standard continues in future issues.

Sincerely  
Thomas Diskel

Engineers





## **ABOUT THE MECHELECIV MAILING and SUBSCRIPTIONS**

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